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Management of Government Quality Assurance Functions for NASA Contracts

Responsible Office: Office of Safety and Mission Assurance

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Preface

P.1 Purpose

This NASA Procedural Requirements (NPR) document sets forth Agency requirements for performance of Government contract quality assurance functions as required by Federal Acquisition Regulation (FAR) Part 46, FAR Part 12, NASA FAR Supplement (NFS) Part 1846, and NPD 8730.5, NASA Quality Assurance Program Policy. The purpose of Government contract quality assurance is to ensure that supplies and services acquired under Government contract conform to contract requirements.

P.2 Applicability

- a. This NPR applies to NASA Headquarters and NASA Centers, including Component Facilities and Technical and Service Support Centers.
- b. This NPR provides requirements for quality assurance functions to ensure that supplies and services acquired under Government contract conform to the contract's quality requirements. Supplies include Government Furnished Equipment (GFE) (i.e., Government-procured equipment that is furnished to NASA contractors). Services include contractor work that directly supports the establishment or verification of product configuration (e.g., basic and applied research, design, manufacture, nondestructive testing, laboratory testing, fabrication, assembly, integration, performance testing, maintenance, refurbishment, repair, calibration) and contractor operation of the delivered acquisition product (e.g., hazardous test facility). The term "services" does not refer to Government contract quality assurance functions assigned to support contractors.
- c. This NPR does not apply to Government contract quality assurance functions related to software. Software assurance functions are defined by NASA-STD-8739.8 and NPR 7150.2.
- d. This NPR does not apply to quality assurance functions related to the acquisition of NASA institutional facilities or to facility maintenance. Quality assurance requirements for facility acquisitions/services are performed in accordance with NPR 8820.2, Facility Project Requirements, NPR 8831.2, Facilities Maintenance and Operations Management, and FAR/NFS regulations.
- e. This NPR does not apply to information technology (IT) services.
- f. This NPR does not apply to grants and cooperative agreements covered by 31 U.S.C. 6301 et seq. or Space Act agreements covered by 51 USC 20113.
- g. In this NPR, all mandatory actions (i.e., requirements) are denoted by statements containing the term "shall." The terms "may" or "can" denote discretionary privilege or permission; "should" denotes a good practice and is recommended, but not required; "will" denotes expected outcome; and "are/is" denotes descriptive material.
- h. In this NPR, all document citations are assumed to be the latest version unless otherwise noted.

P.3 Authority

- a. The National Aeronautics and Space Act, as amended, 51 U.S.C. §20113(a).

- b. Federal Acquisition Regulations (FAR) Subpart 7.5, Inherently Governmental Functions.
- c. FAR Part 12, Acquisition of Commercial Items.
- d. FAR Part 42, Contract Administration and Audit Services.
- e. FAR Part 46, Quality Assurance.
- f. NASA FAR Supplement (NFS) Part 1842, Contract Administration and Audit Services.
- g. NFS Part 1846, Quality Assurance.
- h. NPD 8700.1, NASA Policy for Safety and Mission Success.
- i. NPD 8730.5, NASA Quality Assurance Program Policy.

P.4 Applicable Documents and Forms

- a. FAR Part 2, Definitions of Words and Terms.
- b. FAR Subpart 9.2, Qualifications Requirements.
- c. FAR Subpart 9.3, First Article Testing.
- d. FAR 12.404, Warranties.
- e. NASA Form 1430B, Quality Assurance, Letter of Delegation (LOD) for NASA Contracts.
- f. NPR 7120.5, NASA Space Flight Program and Project Management Requirements.
- g. NPR 8000.4, Agency Risk Management Procedural Requirements.
- h. NPR 8705.4, Risk Classification for NASA Payloads.
- i. NPR 8705.6, Safety and Mission Assurance (SMA) Audits, Reviews, and Assessments.
- j. NASA STD 8709.22, Safety and Mission Assurance Acronyms, Abbreviations, and Definitions.
- k. ISO 17011 Conformity Assessment - General Requirements for Accreditation Bodies Accrediting Conformity Assessment Bodies.
- l. ISO 9001, Quality Management Systems - Requirements.
- m. SAE AS7003, Nadcap Program Requirements.
- n. SAE AS9100, Quality Management Systems - Requirements for Aviation, Space, and Defense Organizations.
- o. SAE AS9101, Quality Management Systems Audit Requirements for Aviation, Space, and Defense Organizations.
- p. SAE AS9104, Requirements for Aviation, Space, and Defense Quality Management System Certification Programs.

P.5 Measurement/Verification

Compliance with the requirements contained within this NPR is continuously monitored by the Centers and by the SMA Technical Authority. Compliance may also be verified as part of selected

life-cycle reviews and by assessments, reviews, and audits of the requirements and processes defined within this NPR.

P.6 Cancellation

NPR 8735.2A, Management of Government Quality Assurance Functions for NASA Contracts, dated August 2, 2006, with Change 1, dated August 9, 2010.

/S/

Terrence W. Wilcutt
Chief, Safety and Mission Assurance

Chapter 1. Introduction

1.1 Government Contract Quality Assurance Overview

1.1.1 Government contract quality assurance refers to the various functions performed by the Government to determine whether a contractor has fulfilled contract obligations pertaining to quality and quantity. The term quality, when used within the context of this NPR, refers to compliance with requirements that are contractually levied upon the contractor, including, but not limited to, safety, technical, item configuration, reliability, and quality management system requirements.

1.1.2 Government contract quality assurance is provided in addition to, not as a substitute for, contractor responsibilities for assuring delivery of conforming product or services.

1.1.3 NASA may perform Government contract quality assurance functions directly or may delegate/assign these functions to non-NASA Federal agencies or quality assurance support contractors.

Note: Final product acceptance, denoted by signature approval, is defined as an inherently Governmental function and may only be performed by Federal Government employees. Support contractors may, however, recommend acceptance of a product or service or act as a liaison for a Material Review Board (MRB) or other similar function.

1.1.4 Government contract quality assurance functions are planned and conducted on the basis of contract risk, per NPD 8730.5, to achieve confidence levels commensurate with the severity of consequences associated with noncompliance and to mitigate circumstances where there is an elevated likelihood of noncompliance.

1.2 Roles and Responsibilities

1.2.1 The Chief, Safety and Mission Assurance provides policy direction for all NASA quality assurance matters. Included in this role are technical guidance on the type and extent of quality assurance requirements appropriate for NASA acquisitions; functional oversight relative to Contract Administration and Audit Service (CAAS) quality assurance delegations; functional oversight relative to the adequacy of quality assurance personnel staffing and training; and independent assurance of the adequacy of program/project office quality assurance surveillance functions per NPR 8705.6.

1.2.2 NASA Center Directors are responsible for providing quality assurance services for all projects and programs hosted by, or assigned to, their Center, including the implementation of management controls to ensure proper performance of Government contract quality assurance functions. These responsibilities are typically delegated to the Safety and Mission Assurance (SMA) office (see paragraph 1.2.5 below).

1.2.3 Program and/or project managers are responsible for the quality of their assigned products and services, including planning and budgeting for implementation of Government contract quality assurance functions and provision of personnel resources. To implement requirements of this NPR, program/project managers shall:

a. Determine acquisition item criticality using input/support provided by the Center SMA office

(Requirement).

b. Develop and implement Program/Project Quality Assurance Surveillance Plans (PQASP) per Chapters 2 and 3 of this NPR using input/support provided by the Center SMA office (Requirement). When required, PQASPs are to be submitted to the Contracting Officer.

c. Appoint a program/project SMA Lead or request SMA Director assignment/provision of a NASA SMA Lead in accordance with local Center organizational governance procedures (Requirement).

1.2.4 Contracting officers are responsible for:

a. Including in solicitations and contracts, as requested by the program/project or SMA lead, applicable FAR/NFS clauses and technical standards pertaining to quality (e.g., quality management system, non-destructive evaluation, calibration, workmanship).

b. Issuing Letters of Delegation (LOD) to non-NASA Federal agencies and contracts to quality assurance support service contractors, as requested by the program/project manager or SMA Lead, specifying quality assurance requirements to be delegated and contracted.

c. Designating in the contract, as requested by the program/project manager or SMA Lead, the place or places where the Government reserves the right to perform quality assurance (i.e., at a Government, contractor, or subcontractor facility). The circumstances under which Government contract quality assurance is to be performed at source and/or at subcontractor facilities are described in FAR 46.402 and 46.405, respectively.

1.2.5 NASA Center SMA Directors, as assigned by the Center Director, are responsible for providing support to contracting officers and program/project managers in the:

a. Selection of acquisition sources that present acceptable quality risk.

b. Selection and assignment of qualified civil service quality assurance professionals, including the NASA SMA Lead, when requested.

c. Development of Government contract quality assurance requirements to be incorporated into PQASPs, quality assurance LODs, support contracts, and commercial item acceptance procedures.

d. Performance of contractor surveys, audits, inspections, or other quality assurance functions considered necessary by the program/project office, contracting officer, and/or Center SMA office.

1.2.6 The NASA SMA Lead appointed by the program/project manager or the Center SMA Director is responsible for supporting the program/project manager and contracting officer on all matters related to Government contract quality assurance, including:

a. Developing PQASPs, LODs, and/or quality assurance support contracts.

b. Identifying key processes, products, documents, records, and performance characteristics requiring Government assurance actions and determining the appropriate level and type of Government contract quality assurance actions to be applied.

c. Ensuring clear and mutual understanding of delegated/assigned quality assurance functions between NASA, the delegated agency, and quality assurance support contractors.

d. Ensuring that delegated/assigned quality assurance functions are properly and effectively performed over the life of the program/project in accordance with the LOD or support contract.

e. Evaluating the adequacy of the PQASP, LOD, support contracts, and commercial item acceptance procedures based on contractor performance and other changing risk factors.

f. Coordinating and integrating quality assurance functions performed by different parties to ensure that the requirements of this NPR are satisfied and to avoid duplication of effort.

1.2.7 Non-NASA Federal agencies are delegated authority to perform CAAS on a reimbursable basis as formally agreed to in a LOD.

Note: The Defense Contract Management Agency (DCMA) is an example of an agency that performs delegated CAAS functions on NASA's behalf.

1.2.8 Quality assurance support contractors perform quality assurance functions on behalf of NASA as tasked under contract.

1.2.9 Third parties are independent organizations that perform specified quality assurance functions on behalf of, and are overseen by, private industry and the Federal Government. Requirements related to third parties are provided in Chapter 7 of this NPR.

1.2.10 NASA personnel, at all levels, are responsible for reporting to the Office of Inspector General and the Office of General Counsel Acquisition Integrity Program Office when they become aware of noncompliant conditions or failure experiences which may constitute evidence of fraud, malpractice, or other serious misconduct.

Chapter 2. Government Contract Quality Assurance Requirements

2.1 Critical and Complex Acquisition Items

2.1.1 Critical acquisition items are products or services whose failure poses a credible risk of loss of human life; serious personal injury; loss of a Class A, B, or C payload (see NPR 8705.4); loss of a Category 1 or Category 2 mission (see NPR 7120.5); or loss of a mission resource valued at greater than \$2M. Complex acquisition items are hardware products which have quality characteristics that are not wholly visible in the end item and for which conformance can only be established progressively through precise measurements, tests, and controls.

2.1.2 Program and project offices and Center SMA offices (see paragraph 1.2.3.c of this NPR) shall perform Government contract quality assurance for acquisitions involving the supply of critical and complex items in accordance with (Requirement):

- a. FAR Part 46, Quality Assurance.
- b. NFS Part 1846, Quality Assurance.
- c. SAE AS9100, Section 7.4.3, Verification of Purchased Product.
- d. Paragraph 2.6 of this NPR, Government Contract Quality Assurance Functions

Note: Space Act Agreements and commercial items acquired per FAR Part 12 do not generally allow or provide for product examination, process witnessing, and auditing functions described in paragraph 2.6.

2.2 Noncritical or Noncomplex Acquisition Items

Program and project offices and Center SMA offices shall perform Government contract quality assurance for acquisitions involving the supply of noncritical or noncomplex items in accordance with (Requirement):

- a. FAR Part 46, Quality Assurance.
- b. NFS Part 1846, Quality Assurance.
- c. SAE AS9100, Section 7.4.3, Verification of Purchased Product.
- d. Government Mandatory Inspection Points (GMIP) per Chapter 8 of this NPR, when determined on a discretionary risk-informed basis to be in NASA's interests.
- e. Nonconformance reporting and corrective action per paragraph 2.6.5 of this NPR as deemed necessary and appropriate in accordance with NASA's interests.
- f. Final product acceptance requirements per paragraph 2.6.6 of this NPR.

2.3 Commercial Items Acquired under FAR Part 12

2.3.1 Program and project offices and Center SMA offices are responsible for performing Government contract quality assurance of acquisitions involving the supply of commercial items acquired under FAR Part 12 procedures that exceed an acquisition threshold of \$2M in accordance with paragraphs 2.3.2 - 2.3.7 below.

Note: Common NASA usage of the term "commercial" (e.g., Commercial Orbital Transportation Services, Commercial Crew Development) may or may not coincide with the FAR definition and usage of the term. Use of the term "commercial," other than within the context of Federal regulations, should not be understood to mean that FAR Part 12 procedures apply.

2.3.2 FAR Part 12.208 requires that contracts for commercial items "...rely on contractors' existing quality assurance systems as a substitute for Government inspection and testing before tender for acceptance unless customary market practices for the commercial item being acquired include in-process inspection. Any in-process inspection by the Government shall be conducted in a manner consistent with commercial practice." Program and project offices and Center SMA offices shall also conduct in-process inspections and testing at contractor facilities when acceptance inspection in order to establish conformance of critical attributes (see paragraph 2.3.6 below) cannot be performed at any other time or location without uneconomical disassembly, destructive testing, or voiding contractor warranties (Requirement).

2.3.3 Program and project offices and Center SMA offices shall perform Document Review, Record Review, and Quality Data Analysis in accordance with paragraph 2.6 of this NPR to assure the adequacy of contractor quality system practices and provide confidence that the contractor will deliver conforming items (Requirement).

Note: Government contract quality assurance methods that involve in-process inspection, testing, or auditing at contractor facilities are commonly referred to as "oversight." Quality assurance methods that do not involve in-process inspection, testing, or auditing, such as Document Review, Record Review, and Quality Data Analysis, are commonly referred to as "insight."

2.3.4 Program and project offices and Center SMA offices shall contact the contractor in cases where Document Review, Record Review, or Quality Data Analysis identifies unacceptable risk, for resolution of quality deficiencies and concerns (Requirement).

2.3.5 Industry-managed third party certification and accreditation processes, where such processes are determined to be credible and objective, shall be utilized in commercial contracts as a substitute for NASA audits and surveillance to attain confidence that contractor quality system processes are adequately performed and will result in delivery of conforming item(s) (Requirement).

2.3.6 Program and project offices and Center SMA offices shall develop and perform acceptance inspection procedure(s) to assure conformance of critical hardware attributes (Requirement). Nonconformances identified during acceptance inspections are reported and resolved in accordance with paragraph 2.6.5, of this NPR.

2.3.7 Program and project offices and Center SMA offices shall use commercial warranties, per FAR 12.404, to assure that the item conforms to contract requirements, is of at least medium-grade quality, and is fit for use (Requirement).

2.4 Commercially Available Off-the-Shelf (COTS) Items

2.4.1 COTS items, as defined in FAR Part 2, should be excluded from use in critical applications

when non-COTS supply sources are available except where quality data demonstrates that the item meets requisite high quality and reliability standards or it is otherwise determined that procurement of the COTS item is in NASA's interests.

2.4.2 Program and project offices and Center SMA offices shall examine critical COTS items to the maximum extent practicable to ensure conformance of critical product attributes (Requirement). Examination may include physical inspections, tests, nondestructive evaluation, and data analysis.

2.5 Research and Development Acquisitions

2.5.1 Government contract quality assurance for research and development (R&D) is governed by FAR Part 46 and NFS Part 1846.

Note: Research and development acquisitions include basic research, applied research, and technology development. For the purposes of this NPR, the term "research and technology (R&T)," as used and defined in other NASA documents, is considered equivalent.

2.5.2 Program and project offices and Center SMA office personnel (see paragraph 1.2.3.c of this NPR) shall perform quality system evaluation for R&D contracts that meet the definition of "critical acquisition item" provided in paragraph 2.1 of this NPR or require adherence to a higher level quality standard (e.g., ISO 9001) (Requirement). Quality system evaluation is to be performed in accordance with paragraph 2.6.3 and include the following elements:

- a. Control of documents.
- b. Control of records.
- c. Personnel competence.
- d. Purchasing.
- e. Preservation of product.
- f. Calibration and control of monitoring, measuring, and test devices.

2.6 Government Contract Quality Assurance Functions

The functions described in paragraphs 2.6.1 through 2.6.6.1 shall be performed by the program office, project office, or Center SMA office, including delegated representatives of those offices (Requirement).

2.6.1 Document Review

2.6.1.1 Review contractor-developed documents when first developed, or whenever document changes are made that affect quality system processes or product attributes, to ensure compliance with contract technical requirements and for adequacy in achieving item conformity (Requirement). Contractor documents include internal work procedures, process instructions, technical documents, and drawings.

2.6.1.2 Select documents for review based on the criticality, complexity, cost, and importance of the product or process that is documented and past product/process performance (Requirement). Document review may be conducted as a separate process from, or in conjunction with, quality system evaluation.

2.6.2 Product Assurance

2.6.2.1 Perform product examination, process evaluation, and record review as described below to assure contractor hardware products (Requirement).

2.6.2.1.1 Product examination involves physical inspection, measurement, and testing of the supplier product to ensure conformity to contract requirements.

2.6.2.1.2 Process-witnessing involves personal observation of supplier work processes or demonstration to ensure compliance with prescribed work instructions and contract requirements. Work processes include processes related to manufacturing, fabrication, assembly, integration, repair, maintenance, refurbishment, test, and inspection.

2.6.2.1.3 Record review involves the examination of recorded evidence demonstrating conformance to contract requirements to ensure product and process conformance to contract requirements. Recorded data, including contractually required data deliverables (e.g., Safety Data Package, Structural Analysis and Reliability Predictions), may document work performance, product attributes, product configuration, product performance, or quality assurance actions performed by the contractor (inspections, tests, measurements).

2.6.2.2 Base the selection of product assurance actions and the sample size and frequency of attribute selection on the following risk factors (Requirement):

- (1) The criticality, complexity, cost, and importance of product supplied.
- (2) The complexity and maturity of the process performed.
- (3) Personnel safety considerations.
- (4) The supplier's past quality performance related to the product supplied or process performed.

Note: Government Mandatory Inspection Points (GMIPs) are Government product assurance actions that are performed on a mandatory basis. GMIP requirements are provided in Chapter 8 of this NPR.

2.6.2.3 Pre-identify product assurance attributes on checklists or by another documented methodology (Requirement).

2.6.2.4 Attest to the accomplishment of product assurance actions by signature, legible-printed name and date, or by an inspection control system such as inspection stamps or electronic medium (Requirement).

2.6.2.4.1 Identify the discrete item examined (including any unique product identification/traceability information), process-witnessed or record-verified and reference the specific requirement being validated, when attesting to the accomplishment of product assurance actions using signatures, stamps, or data entries, (Requirement). Such documentation may be accomplished utilizing the contractor's approved electronic system for indicating inspection status or by the application of a signature or stamp to prerecorded planning documents or records (e.g., material test data) which contain this information.

2.6.2.4.2 Employ an inspection control system when attesting to the accomplishment of product assurance actions using stamps or an electronic medium, that (Requirement):

- (1) Indicates the date of acceptance.

(2) Ensures the legibility and durability of stamp impressions and ensure that stamps do not interlock with other stamps.

(3) Ensures that only properly authorized and qualified persons are permitted to apply stamps or make data entries and that individuals who are authorized to use stamps maintain control of their assigned stamp at all times.

(4) Ensures that data entries and/or stamp impressions provide direct traceability to the individual applying the stamp or making the data entry.

2.6.2.4.3 Not apply stamps, where stamps are applied to inspected supplies, to attest to the accomplishment of product assurance actions in a manner prohibited by drawings or specifications or which may degrade the quality of the product (Requirement).

2.6.2.5 Perform product-assurance actions at subcontractor locations only where necessary to ensure that the contracted organization maintains effective oversight of subcontractors or to ensure compliance with critical product attributes (see paragraph 8.3.f) (Requirement).

2.6.2.6 Be properly qualified and trained concerning the quality assurance technique being practiced and the specific product or processes for which assurance is being provided (Requirement).

2.6.2.7 Control monitoring and measuring devices to the same/applicable requirements invoked upon the contractor (Requirement).

2.6.2.8 Use statistically valid sampling plans, when performing product assurance actions on a sampling basis for which there is a measurable population of items, to achieve prescribed confidence-level objectives (Requirement).

2.6.3 Quality System Evaluation

2.6.3.1 Evaluate the contractor's quality system to ensure compliance with invoked quality program requirements including internally developed procedures (Requirement). Quality system evaluation may be conducted as a single audit or as a combination of discrete audits.

2.6.3.2 Base the frequency of quality system evaluation on the contracted organization's quality history but no less than once every three years (Requirement). Quality system evaluation may be extended in periodicity, exempted, or limited in scope for circumstances where each of the conditions listed in subparagraphs (1), (2), (3), and (4) below exists. For limited scope evaluations, the determination of quality system attributes is to be based on the criticality and complexity of quality system processes and contractor past performance.

(1) The contractor is certified by an accredited SAE AS9100 Certification Body or the contractor's quality system has been formally evaluated and accepted by another Government agency.

(2) Government surveillance (e.g., GMIPs, process witnessing) data, where available, indicates satisfactory levels of compliance.

(3) Quality data and other risk factors (e.g., product/process maturity, AS9100 certification audit results, facility relocation), where available, indicate acceptable risk.

(4) Product delivery data, where available, indicates that the contractor has a history of delivering product that meets contract quality requirements. Supplier quality data can be obtained via the NASA Supplier Assessment system at <http://sas.nasa.gov>.

Note: The following quality system elements, as applicable, are recommended for periodic auditing:

- (1) Control of documents.
- (2) Control of records.
- (3) Control of critical items.
- (4) Control of counterfeit parts.
- (5) Risk management.
- (6) Configuration management.
- (7) Personnel training, qualifications, and competence.
- (8) Design and development control.
- (9) Purchasing, including supplier evaluation/selection, purchasing information, flow-down of technical/quality requirements, and verification of purchased product.
- (10) Production control and process control.
- (11) Product identification, traceability, and identification of inspection/test status.
- (12) Preservation of product, including control of electrostatic discharge, shelf-life control, foreign object debris prevention, detection, and removal, and cleanliness control.
- (13) Calibration and control of monitoring, measuring, and test devices.
- (14) Monitoring and measurement, including internal audit, monitoring and measurement of processes, and monitoring and measurement of product.
- (15) Control of nonconforming product.
- (16) Corrective action.
- (17) Control of Government Furnished Property.

2.6.3.3 Perform and document quality system audits following written audit attributes such as provided in SAE AS9101 (Requirement).

2.6.3.4 Include in-quality system auditing product sampling based on the criticality, complexity, and maturity of the product, personnel safety considerations, and the supplier's past performance related to the product to validate quality system effectiveness (Requirement).

2.6.3.5 Forward quality system audits results involving findings against Agency-wide quality standards (e.g., SAE AS9100, NASA Workmanship Standards) to Supplier Assessment System (SAS) administrators at jsc-sasAdmin@mail.nasa.gov for posting to the SAS Web site (<http://sas.nasa.gov/>) and Agency-wide availability (Requirement). Results pertaining to program/project unique contract requirements or preliminary findings are not required to be forwarded.

2.6.3.6 Report major nonconformance findings and other significant shortcomings in the contractor's quality processes that affect, or potentially affect, the acceptability of hardware for dissemination to affected parties (e.g., other Government agencies, AS9100 accreditation body, AS9100 Registrar Management Committee, Online Aerospace Supplier Information System) to the NASA Office of Safety and Mission Assurance (Requirement).

2.6.4 Quality Data Analysis

2.6.4.1 Collect and analyze contractor quality data not less than annually (Requirement). This data will be used for:

- (1) Identifying problem areas (e.g., products, processes, operations, organizations), common deficiency causes, quality trends, and process variations.
- (2) Adjusting the frequency and content of customer oversight actions, including allocation of quality assurance personnel resources.
- (3) Providing supporting rationale for acceptance/rejection of the contractor's quality system and/or written procedures.
- (4) Initiating corrective action based on identification of systemic problems and trends.
- (5) Sharing information with the contractor to identify quality system trends and areas of weakness.

2.6.4.2 Collect data from contractor-generated metrics, NASA-identified nonconformances, post-delivery quality escapes, and quality data reported by other parties (e.g., DCMA, quality assurance support contractors, and accredited quality system registrars) (Requirement).

2.6.5 Nonconformance Reporting and Corrective Action

2.6.5.1 Document and report Government-identified nonconformances to the contractor for performance of corrective and preventive actions (Requirement).

2.6.5.2 Elevate corrective action requests to the appropriate level of contractor management based on problem criticality, recurrence, and/or nonresponsiveness (Requirement).

2.6.5.3 Require contractor corrective actions to identify (Requirement):

- (1) The root cause(s) for occurrence of the nonconformance.
- (2) The scope of the nonconformance (i.e., total population of nonconforming items based on the identified root cause(s)).
- (3) Remedial corrective actions taken concerning the product(s) found to be nonconforming.
- (4) Measures taken/planned to prevent recurrence of the nonconformity.

2.6.5.4 Follow up on nonconformances determined to be systemic, repetitive, or critical in nature to ensure effective accomplishment of contractor corrective action (Requirement). Government follow-up may consist of first-hand observations or review of verifiable contractor- submitted documentation.

2.6.5.5 Enter Government-identified nonconformances and corrective action reports into an electronic nonconformance reporting and corrective action tracking system and, as appropriate for source evaluation/selection purposes, a past performance information management system (Requirement).

2.6.6 Final Acceptance

2.6.6.1 Verify that contractor supplies and services conform to contract quality and quantity requirements and are formally accepted for delivery to the Government based on performance of the actions prescribed below except where acceptance of nonconforming supplies is determined to be in the Government's interest (see FAR 46.407 and Subpart 46.5) or where provided for by other terms and conditions of the contract (Requirement).

- (1) Final product inspection.
- (2) Validation that there are no outstanding corrective actions resulting from Government or contractor-identified nonconformances affecting acceptability of product.
- (3) Validation that there are no outstanding engineering waivers/deviations impacting acceptability of product and that all applicable engineering waivers/deviations have been approved by the proper technical authority.
- (4) Validation that all required GMIPs, or other contractor-notified mandatory surveillance actions, have been accomplished.

Note: Performance of final acceptance is an inherently Governmental function which is the responsibility of the NASA contracting officer or his/her Government delegate. Performance of final acceptance may not be delegated to a non-Governmental entity.

Chapter 3. Program/Project Quality Assurance Surveillance Plan (PQASP)

3.1 Overview

This chapter provides requirements for development of PQASPs for critical and complex acquisition items as defined in paragraph 2.1.1 of this NPR. The purpose of PQASPs is to identify, in a single unified document, all contractor work operations requiring Government surveillance and the specific method(s) for providing surveillance.

Note: FAR Subpart 46.4 requires the development of contract-specific quality assurance surveillance plans for high-dollar and/or critical Federal acquisitions. Contract-specific quality assurance surveillance plans may be embedded in PQASPs, serve as stand-alone documents, or, for circumstances where the program/project has a single contractor, be equivalent to the PQASP.

3.2 PQASP Preparation and Content

3.2.1 Program/project managers and/or the assigned NASA SMA Lead shall prepare PQASPs that (Requirement):

- a. Describe the activities, metrics, control mechanisms, and organizations that will be conducting quality assurance functions for the program/project.
- b. Are contained in a consolidated and integrated document (i.e., not divided among various/separate documents). The PQASP may be a part of a larger program/project safety and mission assurance plan or may be a stand-alone document.
- c. Incorporate applicable requirements from FAR Part 46 (e.g., contract-specific quality assurance surveillance plan), NFS Part 1846, NPD 8730.5, Chapter 2 of this NPR, and other related documents (e.g., Program/Project Plan, Risk Management Plan, contract, GMIP schedule). The PQASP may cite reference procedures and plans for the performance of specific surveillance actions (e.g., inspections, tests).
- d. Are initially prepared in conjunction with the Statement of Work and periodically adjusted thereafter based on identification of new/changing risk factors and associated mitigation actions (e.g., GMIPs) as the program/project progresses through pre-award activities, Request for Proposal responses, and post-award activities. Risk factor considerations are provided in Appendix C of this NPR.

3.2.2 PQASP authors shall include the following in the PQASP (Requirement):

3.2.2.1 Introduction. Identify the program/project under surveillance; summarize the program/project objectives; and summarize the contents of the applicable contract(s).

3.2.2.2 Objectives. Identify the specific outcomes of quality assurance actions in terms that are quantifiable and measurable.

3.2.2.3 Reference Documents. Identify documents related to performance of quality assurance

functions (e.g., NASA Directives, the Program/Project Plan, the Risk Management Plan, program/project requirements documents, the contract, invoked quality system requirements).

3.2.2.4 Surveillance Functions. Identify the quality assurance surveillance functions to be performed for the program/project in accordance with Chapter 2 of this NPR and the following:

a. Document Review. Identify the quality system procedures to be reviewed and the schedule for document review.

b. Product Assurance.

(1) Identify specific product examinations to be performed including whether these actions are to be performed on a one-for-one, continuing, random, and/or periodic basis.

(2) Identify specific processes to be witnessed including whether these actions are to be performed on a one-for-one, continuing, random, and/or periodic basis.

(3) Identify contractor records to be reviewed including whether the records are to be verified on a one-for-one, continuing, random, and/or periodic basis.

(4) Where sampling is called out, identify specific statistically based sampling plans for product examination, process witnessing, and record review.

(5) List all required GMIPs including product examinations, process witnessing, and record review actions.

(6) Provide a schedule for review of contractor planning documents to ensure that all required GMIPs are correctly incorporated.

(7) Describe the methodology for product assurance monitoring based on changing risk factors including the addition/deletion of temporary GMIPs.

(8) Describe the methodology for validating accomplishment of GMIPs and other mandatory surveillance actions.

c. Quality System Evaluation.

(1) Identify the specific quality system elements to be reviewed.

(2) Develop an audit plan identifying the attributes to be audited. SAE AS9101, Quality Management Systems Audit Requirements for Aviation, Space and Defense Organizations, provides attributes for contractors working to SAE AS9100 quality systems.

(3) Provide a schedule for performance of quality system audits.

d. Quality Data Analysis.

(1) Identify the sources of contractor quality data.

(2) Identify contractor performance metrics to be tracked.

(3) Identify the format and periodicity for reporting contractor performance metrics.

e. Nonconformance Reporting and Corrective Action. Identify the tools, methodology, and format for:

(1) Documentation of nonconformances.

(2) Tracking of nonconformance resolution.

(3) Approval of contractor corrective action responses.

(4) Government follow-up to ensure contractor implementation of effective corrective measures.

f. Final Acceptance. Identify the tools and methods for:

(1) Conduct of final inspection including identification of inspection attributes.

(2) Validation that there are no outstanding corrective actions affecting acceptability of product.

(3) Validation that there are no outstanding or unauthorized engineering departures impacting acceptability of product.

(4) Validation that all GMIPs and other mandatory surveillance actions have been accomplished, including item-by-item accountability for each safety-critical GMIP.

3.2.2.5 Government Metrics. Identify the metrics to be used to assess and report accomplishment of Government quality assurance functions as prescribed in the PQASP and how these metrics will be used to adjust quality assurance activities.

3.2.2.6 Surveillance Organization. Identify the organizational entities of the program/project that will be performing surveillance (i.e., NASA, the delegated agency, and/or quality assurance support contractors), their assigned responsibilities, and their authority to act.

3.2.2.7 Quality Assurance Resources. Identify the personnel, funding, and material resources to be applied to the program/project quality assurance effort.

Chapter 4. Performance of Quality Assurance Functions by Non-NASA Organizations

4.1 Overview

4.1.1 This chapter provides general requirements for NASA contract quality assurance functions that are delegated to non-NASA Government agencies and/or assigned to support contractors. Specific requirements for work performed by delegated agencies, support contractors, and third parties are provided in Chapters 5, 6, and 7, respectively.

4.1.2 NASA Government contract quality assurance functions may be performed by NASA civil service employees or by a delegated Federal agency (e.g., DCMA). Certain functions, as outlined in Chapters 6 and 7, may also be performed by quality assurance support contractors or by an authorized third party (e.g., accredited quality system registrar, Nadcap special process accreditation). Government contract quality assurance functions performed by support contractors are required by FAR Part 46 to be performed under the direction of Government personnel.

4.2 NASA Technical Direction

The NASA SMA Lead shall act as a liaison for providing technical direction and recommendations to delegated agencies and support contractors on matters related to the following (Requirement):

- a. Review and approval functions as defined in NASA requirement documents (e.g., NASA Directives, NASA-STDs) and as contractually specified.
- b. Determination of the adequacy of fabrication, repair, and inspection processes, procedures, and techniques; inspection and test conditions, mandatory inspection points, workmanship standards, and conformance criteria; change control activity; the extent of retest after repair, modification, or substitution; and the adequacy of documentation related to these determinations.
- c. Preparation of procedures, techniques, and plans for the evaluation of supplies and services.
- d. Assessment of contractor quality assurance activities, including control over subcontractors.
- e. Visits to contractor facilities to validate delegated or tasked work-hours, resolve conflicts between the delegated agency or quality assurance support contractor and the contractor, and to evaluate performance, including the adequacy of nonconformance dispositions, corrective actions, and their related documentation and records.
- f. Assistance in the interpretation of contract requirements related to safety, quality, and mission assurance, as coordinated with and concurred in by the contracting office.
- g. Guidance in the development and operation of nonconformance and corrective action systems.
- h. Processing MRB actions and dispositioning nonconforming material.
- i. Evaluation of deviations, waivers, and engineering changes for safety, reliability, maintainability, or quality impacts.

4.3 Coordination of NASA Quality Assurance Functions

When there are multiple NASA delegations and/or tasks at a contractor's facility, duplication of effort and inconsistent surveillance methodologies are to be avoided. Prior to providing a new delegation and/or quality assurance support contractor tasking, NASA SMA Leads shall coordinate their efforts to (Requirement):

- a. Establish agreement among the delegating activities for interpretation of common requirements.
- b. Establish agreement among the delegating activities for acceptance or rejection of delegated agency or surveillance support contractor operational methods.
- c. Place common requirements on the delegated agency or surveillance-support contractor for similar supplies and services.

4.4 Selection of Organizations Performing Quality Assurance Functions

4.4.1 Program/project offices or the Center SMA office, as delegated by the Center Director, are responsible for selecting/assigning the organization that will be responsible for performing Government contract quality assurance functions (NASA civil servants, a delegated agency, quality assurance support contractor, or an authorized third party) based on the qualifications and abilities of the organization in relation to the needs and objectives of the quality assurance function(s).

4.4.2 The NASA office delegated to select an organization to perform quality assurance functions shall evaluate the following requirements and factors in the selection process (Requirement):

- a. Final product acceptance is defined as an inherently Governmental function that may only be performed by NASA or other Federal agency personnel.
- b. Quality assurance actions which verify compliance with critical contract requirements may only be performed by Federal agency personnel or under the direction and supervision of Federal agency personnel.
- c. The long-term availability of personnel for the duration of the contract support.
- d. Ability to provide quick response time.
- e. Ability to implement specialized surveillance.
- f. Technical, programmatic, product, and process training, qualifications, and certifications.
- g. The availability of inspection and test facility.
- h. The delivery schedule requirements.
- i. Contract quality provisions including frequency and timing of inspections/monitoring.
- j. The technical nature of the product and specialized skills/knowledge needed.
- k. The location of other delegations or task orders at nearby facilities.

4.5 Planning

4.5.1 Quality assurance planning discussions between the NASA SMA lead, the delegated agency or

quality assurance support contractor, and other responsible NASA parties (e.g., contracting officer, project office, safety officer) are to be conducted to ensure that support requirements, operating channels, and procedures are thoroughly/mutually understood prior to transmitting LODs or task orders. The NASA SMA Lead shall ensure that the planning conference includes discussions of the following (Requirement):

- a. Contract and subcontract quality requirements.
- b. End-use and criticality of supplies and services.
- c. Current procedures and general operations, particularly those applicable to supplies and services similar to those being procured.
- d. Technical direction to be given to the contractor.
- e. Functions to be delegated or tasked and the performance desired.
- f. Special skills, knowledge, qualifications, training, and certifications required.
- g. Quality assurance functions to be performed at the contractor's facility by NASA personnel.
- h. Channels of communication.
- i. Past quality assurance history of the contractor, known contractor deficiencies, and the contractor's progress in correcting deficiencies.
- j. MRB authority.
- k. Redlegation and flowdown of requirements.
- l. Interface situations arising from partial delegations, Department of Defense delegations, or other NASA delegations in the same facility.
- m. Response time for mandatory inspections.
- n. NASA, delegated agency, and contractor responsibilities related to the reporting, tracking, corrective action resolution, and closure of contract nonconformances.

4.6 Monitoring of Delegated Agency and Support Contractor Performance

4.6.1 NASA SMA Leads shall establish management controls to ensure that LOD and support contract requirements are effectively complied with and remain current (Requirement). Evaluation activities can include independent assessments, surveys, periodic review of plans and reports, observation of performance, and evaluations and assessment of work-hour reporting.

4.6.2 NASA SMA Leads shall provide evaluation results to the delegated agency/quality assurance support contractor (Requirement).

4.6.3 The contracting officer, in coordination with the NASA SMA Lead, shall formally request corrective action from the delegated agency or support contractor upon discovery that the organization is providing inadequate quality assurance support that does not comply with the LOD or support contract (Requirement). The existence of one or more of the following conditions constitutes inadequate quality assurance support:

- a. Lack of an adequate plan describing quality assurance functions to be performed.
- b. Unsatisfactory performance of delegated and/or contracted functions as evidenced by:
 - (1) Direct NASA observation of inadequately performed work.
 - (2) Inadequate quality of delivered supplies or services.
 - (3) Mishaps or process escapes revealing significant contractor quality system inadequacies.
- c. Unsatisfactory or untimely reports or records demonstrating proper implementation of delegated or tasked quality assurance functions (e.g., quality status reports, audit records).
- d. Use of unqualified personnel.
- e. Lack of adequate and/or untimely resource reporting to NASA.
- f. Inadequate allocation of internal resources (personnel or funding).

Chapter 5. NASA Letters of Delegation (LOD)

5.1 Overview

FAR Part 42 and NFS Part 1842 specify that contracting officers may delegate contract administration or specialized support services. This chapter describes the planning, composition, and issuance of LODs which identify specific delegated Government contract quality assurance functions.

5.2 LOD Content

5.2.1 NASA Form (NF) 1430B specifies contract administration quality assurance functions assigned to a delegated agency, including requirements and sample text for NASA LODs. Requirements are identified as either mandatory or discretionary. Mandatory requirements apply to all LODs. Discretionary requirements are assigned on a case-by-case basis and will vary from contract to contract due to projected program/project risk. Regardless of whether a requirement is mandatory or discretionary, contracting officers are encouraged to use the standardized sample text provided in NF 1430B.

5.2.2 The delegation requirements of NF 1430B are not intended to be all inclusive or to preclude contracting officers, program/project management, or SMA personnel from incorporating additional requirements in the LOD based on program/project needs.

5.2.3 The requirements of NF 1430B are provided in a menu format, enabling contracting officers to readily identify whether a surveillance function is to be delegated or retained.

5.2.4 The program/project or SMA lead shall identify the surveillance functions to be delegated by providing a completed NF 1430B to the contracting officer (Requirement)

5.2.5 Contracting officers shall incorporate the following in LODs as provided by the program/project or SMA Lead (Requirement):

- a. Quality assurance surveillance requirements via NF 1430B.
- b. Name, location, and telephone number of the designated SMA Point of Contact (POC) who serves as NASA's principal POC and technical/contractual authority liaison for matters pertaining to the delegation and a request for the delegated agency to include this information in letters of redelegation.
- c. The identification of any quality assurance decisions which require review by the NASA SMA Lead prior to, and after acceptance for, the Government.
- d. Point of contact for obtaining assistance with locating any NASA-unique documents.
- e. Dates, frequency, and distribution for submittal of required delegated agency reports.
- f. Information concerning assignment of NASA technical representatives at the contractor's facility including names and functions to be performed.
- g. Request for the name of the delegated agency representative to serve as the principal point of contact for the facility where the delegated functions are to be performed.

- h. Extent of redelegation authority.
- i. Criteria for delegated agency selection of mandatory actions if applicable.
- j. Special instructions on preparation and distribution of shipping and acceptance documents.
- k. Identification of the delegated agency's responsibility for interim acceptance and for support at the remote site where final acceptance is to occur (for circumstances where final acceptance of supplies and services is not to occur at the contractor's facility).
- l. Instructions regarding the respective responsibilities and authority of the delegated agency and NASA personnel (for circumstances where the delegated activities involve interface with NASA personnel (e.g., end item test and inspection)).
- m. Identification of special training and qualification requirements for personnel performing delegated functions, including special process certifications (e.g., nondestructive testing, workmanship) and job classifications or competencies of personnel needed (e.g., safety engineer).

5.3 Redelegations

5.3.1 Redelegation is the formal action taken by a delegated agency when a portion of the required SMA functions cannot be performed because of geographical location, facility cognizance, technical or administrative capability limitations, or inter-Governmental Agency agreements. The NASA Center may choose to withhold redelegation authority, provide complete redelegation authority, or provide the delegated agency with specific directions on functions to be redelegated. Redelegation is performed by the cognizant contracting officer in accordance with FAR and NFS procedures.

5.4 Action upon Completion of Delegated Functions

5.4.1 Delegated agency facility quality assurance files are normally considered closed when the last supplies/services on the contract have been delivered/performed. Contract close-out is performed by the cognizant contracting officer in accordance with FAR and NFS procedures. The contracting officer shall advise the delegated agency to retain the delegation for easy retrieval and to hold the delegation open when conditions exist or are expected that would justify extension of the contract period of performance (Requirement).

Chapter 6. Quality Assurance Support Contracts

6.1 Overview

6.1.1 This chapter describes considerations for the planning, composition, and issuance of quality assurance support contract(s). These contracts assign specific Government contract quality assurance functions to be performed at a contractor location and serve as the authoritative link between NASA and the designated quality assurance support contractor.

6.2 Planning Quality Assurance Support Contracts

6.2.1 Programs/projects or SMA leads shall develop and issue quality assurance support contracts in sufficient time to permit accomplishment of assigned quality assurance functions coincident with the commencement of contractor work operations (Requirement).

6.3 Quality Assurance Support Contract Contents

6.3.1 Programs/projects or SMA leads shall identify quality assurance surveillance functions to be performed by the support contractor utilizing the text and format provided in NF 1430B and provide this information to the cognizant contracting officer (Requirement).

6.3.2 The contracting officer is responsible for issuing support contracts which incorporate the surveillance requirements provided by the program/project or SMA Lead.

6.3.3 The contracting officer may not include performance of inherently Governmental functions, as defined in FAR Subpart 7.5, in quality assurance support contracts (Requirement).

Note: Final product acceptance, denoted by signature approval, is defined as an inherently Governmental function and may only be performed by Federal Government employees. Support contractors may, however, recommend acceptance of a product or service or act as a liaison for a material review board or other similar function.

Chapter 7. Third Party Certification/Accreditation

7.1 Certain Government contract quality assurance functions, such as Quality System Evaluation and Process Witnessing, may be performed by third party certification/registration bodies or in accordance with accreditation programs approved by this NPR. The following certification/registration bodies and accreditation programs are authorized as augmentation of, and/or substitution for, Government contract quality assurance functions for NASA contracts:

- a. SAE AS9100 certification/registration bodies accredited in accordance with SAE AS9104.
- b. ISO 9001 certification/registration bodies accredited in accordance with ISO 17011.
- c. Nadcap accreditation program in accordance with SAE AS7003.

Chapter 8. Government Mandatory Inspection Points (GMIPs)

8.1. General

8.1.1 GMIPs are NASA-mandated product assurance actions that are performed at, or prior to, a specific point in the product's life by NASA or a delegated agent of NASA. Product assurance actions include product examination, process witnessing, and record review (often referred to as "verification"). Delegated agents include non-NASA Government agencies and quality assurance support contractors that are independent of the contractor under surveillance.

Note: Government inspection is performed in addition to, not as a substitute for, contractor inspection and does not relieve the contractor of its responsibilities to perform contractually required inspections (e.g., 100 percent inspection of safety critical attributes).

8.2 Selection and Assignment of GMIPs

8.2.1 Program/project offices, with NASA SMA Lead and SMA office support, shall determine and assign GMIPs based on an analysis of risks related to contract noncompliance in accordance with the following (Requirement):

a. Safety-critical GMIPs are performed in order to assure conformance to hardware characteristics, manufacturing process requirements, operating conditions, and functional performance criteria that, if not met, can result in loss of human life. Except as exempted below, program/project offices shall assign a safety-critical GMIP for every (i.e., 100 percent) product/process/ performance attribute where noncompliance could credibly result in loss of life (Requirement). Exemption of safety-critical attributes from GMIP assignment/performance requirements may be based on statistical process controls and/or formally documented risk analysis.

(1) Exemption based on statistical process controls is allowed for repetitive work processes where all of the following apply: GMIPs are performed in accordance with a statistically meaningful sampling plan; contractor process controls are applied to achieve acceptably low levels of process variation; and Government oversight validates effective contractor process controls.

(2) Exemption based on documented risk analysis is allowed where technical analysis of risk factors indicates acceptably low probability of noncompliance. Risk analysis may include factors such as the following:

- (a) Contractor inspection results.
- (b) Government inspection results.
- (c) Hazard analysis controls/mitigation.
- (d) Failure modes and effects analysis controls/mitigation.
- (e) Design complexity.
- (f) Technology maturity.

- (g) Process maturity.
- (h) Contractor quality system controls.
- (i) Metrics related to contractor past performance.
- (j) Probabilistic risk assessment.

b. For circumstances where noncompliance could not credibly result in loss of human life, but could result in serious personal injury, loss of a Class A, B, or C payload (see NPR 8705.4), loss of a Category 1 or Category 2 mission (see NPR 7120.5), or loss of a mission resource valued at greater than \$2M, program/project offices shall assign GMIPs on a discretionary risk-informed basis to attain satisfactory confidence of contract compliance (Requirement). Confidence levels are to be commensurate with the severity of consequences that would be incurred in the event of noncompliance.

c. Where analysis indicates an unacceptable likelihood of conformance with a key product attribute or process requirement, program/project offices shall assign GMIPs on a discretionary risk-informed basis to attain satisfactory confidence of contract compliance (Requirement). Factors indicting potential elevated likelihood include process maturity, complexity, and contractor past performance.

d. Program/project offices shall evaluate the following sources of information during the GMIP definition process (Requirement):

- (1) Design, safety, drawing, engineering, configuration, and technical document reviews.
- (2) Reliability, maintainability, and system safety tests and analyses.
- (3) Development, qualification, certification, and acceptance tests.
- (4) Failure Mode and Effects Analysis/Critical Items List and Hazards Analysis.
- (5) Interface and interchangeability requirements.
- (6) Contractor fabrication procedures, process control instructions, and design standards/manuals.
- (7) Performance of root cause analyses and implementation of preventative and corrective actions.
- (8) Nonconformance reports and records of contractor/supplies/services history.
- (9) Feedback from the NASA Center or the delegated agency.
- (10) Critical item and critical characteristic lists developed by the contractor.
- (11) Contractor quality assurance manuals, requirements, and selected quality system documents.

e. Program/project offices shall evaluate the following conditions, operations, and quality assurance functions during the GMIP definition process (Requirement):

- (1) Validation of critical process controls.
- (2) Qualification, certification, and first article tests.
- (3) Acceptance tests and/or inspection of hardware end items and selected nondeliverable hardware and tooling. This includes test readiness.
- (4) Preshipment review (data package review, shipment readiness, and shipping/acceptance document sign-off).

- (5) Inspection and test of repaired, reworked, or modified supplies.
- (6) Teardown, buildup, test, and inspection of Government equipment returned for overhaul or refurbishment.
- (7) Failure analyses.
- (8) Refurbishment of previously accepted supplies.
- (9) Products/processes that have a history of frequent configuration changes or frequent fabrication, inspection, and test nonconformances.
- (10) Configuration verification.
- (11) Hazardous or critical industrial operations such as lifting operations, contamination inspections, shipping operations.

8.2.2 The delegated agency or the quality assurance support contractor, as approved by the NASA SMA Lead, may create and assign GMIPs on a temporary basis based on a determination of elevated risk or adverse trends.

8.3 Performance of GMIPs

Program/project office and/or SMA office personnel responsible for the administration and performance of GMIPs shall (Requirement):

- a. Perform 100 percent of all assigned GMIPs in strict accordance with the prescribed technical criteria.
- b. Request formal disposition/authorization for GMIP omissions, waivers, or deviations from the designated NASA technical authority. The designated technical authority will normally be the person or office that selected and defined the GMIP requirement and may reside in the Center SMA office, program office, or engineering office in accordance with local Center governance procedures.
- c. Indicate as acceptable only those characteristics that have been personally examined, witnessed, or verified.
- d. Perform GMIPs after contractor personnel have made their acceptance decisions, except in those cases where concurrent inspections/tests are necessary to avoid the need for destructive testing or to prevent excessive costs or potential time delays.
- e. Perform GMIPs as late as practicable in the material fabrication/installation/delivery cycle for circumstances where GMIP attributes can be altered (e.g., contamination).
- f. Perform GMIPs at subcontractor facilities only when required in the Government's interest, as specified in FAR 46.405.
- g. Attest to the completion of GMIPs in accordance with the requirements of paragraph 2.6.2.4 of this NPR.
- h. Sign a statement indicating that they understand that their signature, application of a stamp, or data entry is a professional, individual warranty (guarantee) that they personally examined the product, witnessed the process, or verified the record as literally stated for the GMIP acceptance criteria.

- i. Maintain positive controls which assure that all assigned GMIPs are incorporated into planning documents, where applicable, and accomplished.
- j. Report, track, and ensure proper resolution of nonconformances identified during the conduct of GMIPs in accordance with paragraph 2.6.5 of this NPR.
- k. Where GMIP accomplishment is attested to by stamps/signatures on contractor developed/maintained planning records or data, verify that such records are readily retrievable.

8.4 Special Requirements for Safety-Critical GMIPs

8.4.1 Safety-critical GMIPs may only be performed by Government personnel or under the direction and supervision of Government personnel.

8.4.2 When safety-critical GMIPs are assigned to non-Governmental personnel, NASA program and project offices and Center SMA offices shall perform periodic/random spot checks of GMIP performance, and other measures as necessary, to ensure that such persons are properly trained and qualified and are carrying out these inspections in an objective and competent manner (Requirement).

8.4.3 Personnel responsible for planning the performance of safety-critical GMIPs shall specify product examination or process witnessing versus record review whenever practicable (Requirement).

8.5 Contractor Interface for Performance of GMIPs

8.5.1 Onsite Government representatives (i.e., NASA, delegated agency, or support contractors) working with the contractor shall:

- a. Incorporate GMIPs as hold points on contractor work planning documents (Requirement).
- b. Develop a GMIP notification process that assures sufficiently advance Government notification of work operations involving GMIPs, that results in timely performance of GMIPs, and that results in minimal disruption to contractor work operations (Requirement).
- c. Establish specific guidelines and requirements regarding contractor continuance of work operations in the event that the Government does not arrive within a specified agreed-to time frame to perform an assigned GMIP (Requirement).

Appendix A. Definitions

A.1 Definitions for SMA terms are found in NASA-STD 8709.22. See NASA-STD 8709.22 for definitions of the following terms:

- a. Contract
- b. Complex Item
- c. Complex Work
- d. Critical
- e. Delegated Agency
- f. Final Acceptance
- g. Government Contract Quality Assurance
- h. Government Mandatory Inspection Point (GMIP)
- i. Nadcap
- j. Process Witnessing
- k. Product Examination
- l. Program/Project Quality Assurance Surveillance Plan (PQASP)
- m. Quality Assurance Letter of Delegation (LOD)
- n. Quality Assurance Support Contractor
- o. Record Review

A.2 Terms unique to this document are defined below.

a. *Safety-Critical GMIP*: GMIPs performed to ensure compliance with contract requirements that, if violated, can credibly result in loss of human life. This includes witness or verification of hardware, manufacture, assembly, integration, test, maintenance, operation, or nonconformance resolution tasks which, if incorrectly accomplished, could result in loss of life.

Appendix B. Acronyms

| | |
|-------|---|
| DCMA | Defense Contract Management Agency |
| CAAS | Contract Administration and Audit Services |
| COTS | Commercially Available Off-the-Shelf |
| FAR | Federal Acquisition Regulations |
| GFE | Government Furnished Equipment |
| GMIP | Government Mandatory Inspection Point |
| LOD | Letter of Delegation |
| NF | NASA Form |
| NFS | NASA FAR Supplement |
| POC | Point of Contact |
| PQASP | Program/Project Quality Assurance Surveillance Plan |
| R & D | Research and Development |
| SAS | Supplier Assessment System |
| SMA | Safety and Mission Assurance |

Appendix C. Program and Project Risk Considerations

This Appendix discusses the identification and analysis of potential risk factors to be considered during development of the PQASP.

1. Identification of Contract Risks.

For each contract, there is a set of characteristics which have been identified as contract requirements. These contract-specified items are established during the formulation subprocess of the program/project and have been determined to be critical for the overall contract performance. Other nonspecified items are often related to practices or product features that the contractor has been given flexibility in performing. In identifying contract delivery risks during contract development, source selection, contract award negotiation, and contract performance, contract-specified items should be a primary area of consideration. In order to accomplish these functions effectively, it is imperative that the NASA SMA Lead has substantial, direct involvement with the contract development, source selection, contract award, and contractor performance evaluation activities. Typical risks include, but are not limited to, clarity and stability of requirements, introduction of new or developing technology or processes, schedule, compatibility, interfaces, or other specified design and/or process conditions.

2. Analyzing the Impact of Contract Risks.

2.1 After establishing the list of potential contract delivery risks, each risk will need to be evaluated to estimate the consequences of the risk, the likelihood of the risk occurring, and the timeframe in which action must be taken to ensure effective mitigation of the identified risk. NPR 8000.4, Agency Risk Management Procedural Requirements, provides the overall process requirements for performing these analyses.

2.2 The following are considerations in establishing consequence (severity) of the risks:

- a. Safety — Do risks involve risk to the public, risk to astronauts and pilots, risk to the NASA workforce, risk to high value equipment and/or mission success?
- b. Cost — Could risk have a significant impact to the overall project/process operating cost?
- c. Schedule — Could risk impact a "long-lead item," involve a deliverable that is not off-the-shelf, have limited contingency or margin options, or otherwise have the potential to significantly impact project/process schedule?
- d. Performance — Could risk significantly reduce user group access, availability, or mission life or impact the mission success criteria?

2.3 For the identified risks, evaluation is required to establish the likelihood of occurrence. This determination can involve a combination of quantitative as well as qualitative considerations. The contract risks will change throughout the program/project life cycle requiring periodic re-evaluation. Considerations in determining the likelihood of occurrence include the following:

- a. Goals — Do the contract requirements involve high-precision, sensitive components, or difficult-to-obtain performance features?
- b. Margin — Do the contracted requirements have a low factor of safety, margin of error, or tight

design tolerances?

c. Control — Do the contracted requirements involve processes prone to human error or issues with process stability, repeatability, or output control?

d. Redundancy — Do the contracted requirements involve safety or mission success functions that are not failure tolerant?

e. Maturity — Do the contracted requirements involve new technology, a new application, or nonstandard process techniques, tools, or equipment?

f. Heritage — Do the contracted requirements have a prior history of performance or capability issues for the same or similar design or processes?

g. Inspection — Do the contracted requirements fail to specify receiving, in-process, and/or final inspection, test, or monitoring at the contract location that would be an effective screen?

h. Problems/Issues — During the performance of the contract, have technical and/or quality issues occurred which require direct Government involvement to resolve the issue?

i. Contractor Quality System — Is there a lack of confidence in the quality system of the contractor, including reasons listed below?

(1) NASA does not have knowledge of a quality assurance audit performed by a credible source.

(2) The contractor has not demonstrated acceptable past quality performance.

(3) The contractor is new to working with NASA and NASA-type requirements.

(4) The contractor has experienced instability in their quality system or continuous nonconformance issues with any aspect of their quality system.

(5) The contractor has insufficient performance measures or incentives for contract monitoring.